

## Division opinion: Insulation and curb heights at replacement rooftop HVACR

Code Reference: Minnesota Rules, Chapter 1323, Sections 5.5.3.1 and 6.1.1.3.6

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Issued by: Greg Metz, State Building Official

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### Interpretation of the 2024 Minnesota Commercial Energy Code

**5.5.3.1 Roof insulation.** All roofs shall comply with the insulation values specified in Tables 5.5-0 through 5.5-8. Skylight curbs, mechanical curbs, and other roof curbs shall be insulated to the level of roofs with insulation entirely above the deck or R-10, whichever is less.

Exception: Historical buildings with roof slopes two units vertical in 12 units horizontal (2:12) or less.

**6.1.1.3.6 Rooftop HVACR.** Unless technically infeasible, new and replacement rooftop equipment shall be provided with new insulated curbs in accordance with Section 5.5.3.1. The replacement curbs shall be of sufficient height to permit the installation of insulation that complies with Tables 5.5-6 and 5.5-7 when roof replacement occurs.

### Background

Prior to these amendments, there were no insulation requirements at all for roof curbs supporting rooftop HVAC equipment. Contractors have been installing roof curbs with R-5 insulation because there was guidance given for skylight curbs and the application is similar. For roofs with above the deck insulation, changes in the energy code require the installation of more insulation when the roof covering is replaced. Designers have frequently used an exception to the R-value requirement if positive drainage on the roof can't be maintained. Low curb heights for rooftop mechanical equipment have been a limiting factor to achieving greater energy code compliance for the entire roof assembly. Since additional insulation will be required the next time the roof is replaced, it is most

effective to upgrade the roof curb when equipment is added, moved, or replaced in preparation for the additional insulation thickness.

## Intent

The intent and purpose of these amendments are to address two aspects: One, Section 5.5.3.1 provides an insulation standard for mechanical curbs installed on roofs because the requirement does not exist in the 2019 ASHRAE 90.1 model standard. Two, Section 6.1.1.3.6 elevates the equipment to provide the physical space for additional insulation that will be required when the roof is next replaced. Minnesota Statute 326B.101 states that amendments to the state building code shall “...*provide basic and uniform performance standards...*”. Setting a performance standard with a curb insulation resistance of R-10 and a curb height requirement to support roof covering replacement with code-compliant insulation depth and sufficient freeboard to facilitate positive drainage is that performance criteria.

## Division opinion

1. The application of these code sections is limited to curbs on roofs where the insulation is located above the roof deck, because there is no reason to insulate a curb above an unconditioned attic space.
2. Because the building code’s charging statement in Minnesota Statutes 326B.101, subpart 1 pertains to establishing performance standards, the requirement for a “new” curb is not necessary if the existing conditions meet or can be modified to achieve the insulation performance requirements without creating other code violations.
3. Technical infeasibility due to structural capacity of the existing roof will need to be demonstrated and certified by a licensed structural engineer for that roof portion which establishes curb height for the rooftop mechanical equipment being replaced.
4. Curb extensions and supplemental insulation are acceptable for modifying existing curbs to comply with the requirements provided that positive drainage can be maintained.